



8th INTERNATIONAL SYMPOSIUM ON
CAROTENOIDS

BOSTON/27-31/JULY 1987



Monday, 27 July 1987

8:45 - 9:00 am SYMPOSIUM OPENING

Session 1: EUGSTER SYMPOSIUM ON NEW STRUCTURES

Session Chairs: S. Liaaen-Jensen (Trondheim)
K. Tsukida (Kobe)

9:00 - 9:45 am C.H. Eugster (Zurich): Recent Progress in Carotenoid Structures

9:45 - 10:15 T. Bjørnland (Trondheim): Carotenoid Structures and Lower Plant Phylogeny

10:15 - 10:30 Break

10:30 - 11:00 J. Szabolcs (Pecs): Plant Carotenoids

11:00 - 11:30 T. Matsuno (Kyoto): Animal Carotenoids

11:30 - 12:00 P.F. Zagalsky (Surrey): Carotenoproteins

Session 2: NEW ANALYTICAL METHODS

Session Chair: B.C.L. Weedon (Nottingham)

1:30 - 2:15 pm J. Lugtenburg (Leiden): New Analytical Techniques in Carotenoid and Retinoid Chemistry

2:15 - 3:00 R.F. Taylor (Cambridge, MA): Advances in HPLC and HPLC-MS Analysis of Carotenoids

3:00 - 3:15 Break

3:15 - 4:00 N.E. Craft, J.M. Brown-Thomas and M.C. Kline (Gaithersburg, MD): Efforts Toward the Development of Standard Reference Materials For β -Carotene and Retinol Determinations

4:00 - 4:15 M. Kimura and D.B. Rodriguez-Amaya (Campinas): Assessment of the Saponification Step in the Quantitative Determination of Carotenoids and Provitamin A

4:15 - 4:30 S.E. Moshier (Omaha, NE): Chromatography of Carotenoids to Distinguish Mycobacterium poriferarum from M. aurum

4:30 - 4:45 H.J.C.F. Neils and A.P. DeLeenheer (Gent): Exhaustive Extraction, Profiling and Quantitation of Bacterial Carotenoids

Session 2: NEW ANALYTICAL METHODS (Continued)

- 4:45 - 5:00 B. Tan and J. Ng (Amherst, MA): Elucidation of Palm Oil Carotenoids
- 5:00 - 5:15 F. Khachik, G.R. Beecher and W.R. Lusby (Beltsville, MD): Separation, Identification and Quantitation of Carotenoids and Carotenol Fatty Acid Esters in Selected Fruits and Vegetables by HPLC

Tuesday, 28 July 1987

Session 3: CAROTENOID SYNTHESIS

Session Chair: H.J. Mayer (Basle)

- 8:30 - 9:15 am H. Pfander (Berne): Recent Advances in Carotenoid Syntheses
- 9:15 - 9:45 R.S.H. Liu (Honolulu): Recent Advances in Retinoid Synthesis and Visual Pigment Analog Studies
- 9:45 - 10:00 Break
- 10:00 - 10:30 S. Liaaen-Jensen (Trondheim): Artifacts of Natural Carotenoids
- 10:30 - 10:45 M. Ito, Y. Mantani, K. Tsukida, Y. Shichida, S. Ioshida and T. Yoshizawa (Kobe and Kyoto): Novel Bicyclic Retinals and Their Rhodopsin Analogs
- 10:45 - 11:00 S.S. Mohanty, P. Uebelhart and C.H. Eugster (Zurich): Use of Deuterium Labelled, Water Soluble Precursors in Studies of the Carotene Cyclization Step
- 11:00 - 11:15 M. Acemoglu and C.H. Eugster (Zurich): The Optically Active 3-hydroxy-5,6-epoxy- β -endgroup: Total Synthesis and Synthetic Applications
- 11:15 - 11:30 M. Gmunder, B. Aeschlimann and C.H. Eugster (Zurich): Synthesis of Optically Active Oxabicyclo-(2.2.1)-heptane Endgroups
- 11:30 - 11:45 A. Haag, U. Marti and C.H. Eugster (Zurich): Synthesis of Optically Active Allenic Endgroups
- 11:45 - 12:00 U. Hengartner, K. Bernhard, G. Englert and E. Glinz (Basle): Synthesis of (Z)-isomers of Lycopene

Wednesday, 29 July 1987

Session 4: CAROTENOID BIOSYNTHESIS

Session Chair: W. Rau (Munich)

- 8:30 - 9:15 G. Britton (Liverpool): Carotenoid Biosynthesis - An Overview
- 9:15 - 9:45 P.M. Bramley (Egham): The Use of Cell-Free Systems in Studies of Carotenoid Biosynthesis
- 9:45 - 10:00 Break
- 10:00 - 10:30 H. Kleinig (Freiburg): Inhibition of Carotenoid Biosynthesis
- 10:30 - 10:45 G. Sandmann (Konstanz): In Vitro Studies With Herbicidal Inhibitors of Carotenogenic Enzymes
- 10:45 - 11:00 P. Barry and G. Britton (Liverpool): The Use of Deuterium Labelling to Determine the Origin of Chloroplast Carotenoids During Greening of Etiolated Barley
- 11:00 - 11:15 F. Luetke-Brinkhaus and H. Kleinig (Freiburg): Phytoene Synthase in Plastids
- 11:15 - 11:30 U. Mitzka-Schnabel and E. Seigner (Munich): Carotenogenic Enzymes From Neurospora
- 11:30 - 11:45 L.M. Salgado, E.R. Bejarano and E. Cerda-Olmedo (Sevilla): Study of Regulatory Mutants in the Beta-Carotene Biosynthesis Pathway of Phycomyces blakesleeanus
- 11:45 - 12:00 A. Mackenzie, D.S. Nelki and P.M. Bramley (Egham): Isolation of Fungal Carotenogenic Genes

Session 5: FUNCTIONAL ROLES OF CAROTENOIDS

Session Chairs: B.H. Davies (Aberystwyth)
J.A. Schiff (Waltham, MA)

- 1:30 - 2:00 pm Y. Koyama (Nishinomiya): Role of Carotenoids in Photosynthesis
- 2:00 - 2:30 T.A. Moore and D. Gust (Tempe, AZ): Energy Transfer to and from Carotenoids
- 2:30 - 3:00 O.H. Will III and C.A. Scovel (Sioux Falls, SD): Photoprotective Functions of Carotenoids

Session 5: FUNCTIONAL ROLES OF CAROTENOIDS (Continued)

- 3:00 - 3:15 Break
- 3:15 - 3:45 G. Ourisson, Y. Nakatani, T. Lazrak, A. Milon, G. Wolff, Y. Diyizou, A. Genevois, B. Chappe and H. Musikas (Gif-sur-Yvette): Membrane Properties of Carotenoids, A Phylogenetic Hypothesis
- 3:45 - 4:00 A.L. Moore, D. Gust, T.A. Moore, L.R. Makings, P. Liddell, D. Barrett, E. Bienvenue and P. Seta (Tempe, AZ and Montpellier): Synthesis and Charge Transfer Processes in Carotenoid-Containing Photoredox Centers
- 4:00 - 4:15 R.A. Bone, J.T. Landrum, G.W. Hime, L. Fernandez and J. Martinez (Miami, FL): Mass Spectrometric Identification of the Macular Pigments
- 4:15 - 4:30 H.J.C.F. Nelis and A.P. DeLeenheer (Gent): A Possible Role of cis-Canthaxanthin in Artemia Development
- 4:30 - 4:45 U.C. Goswami (Assam): Carotenoid-free Diet and its Role in Reproduction in Freshwater Fish
- 4:45 - 5:00 S. Takagi, T. Yamagami, K. Takeda and T. Takagi (Okayama): Helical Configuration of Lutein Aggregate Dispersed in Liposomes of Phosphatidyl Choline (PC) and Digalactosyldiglyceride (DGDG)
- 5:00 - 5:15 M. Tomoaia-Cotisel, J. Zsako and E. Chifu (Cluj-Napoca): Interactions in Lipido-carotenoid Systems

Thursday, 30 July 1987

Session 6: CAROTENOID METABOLISM AND NUTRITION

Session Chairs: L.J. Machlin (Nutley)
K.L. Simpson (Kingston, RI)

- 8:30 - 9:15 am K. Schiedt (Basle): New Aspects of Carotenoid Metabolism in Animals
- 9:15 - 9:45 G.R. Beecher, F. Khachik and P.J. Schuhmann
(Beltsville, MD): Distribution of Carotenoids in Foods
- 9:45 - 10:00 Break
- 10:00 - 10:30 N.V. Dimitrov (E. Lansing, MI): Bioavailability of Carotenoids
- 10:30 - 10:45 A.B. Barua and J.A. Olson (Ames, IA): Synthesis, Metabolism and Biological Actions of Vitamin A Glucuronides
- 10:45 - 11:00 B.C. Goswami and G. Britton (Liverpool): Mechanisms of the Conversion of β -carotene into Vitamin A
- 11:00 - 11:15 J. Hudon (Storrs, CN): Characterization of a 4-keto Carotenoid Producing Enzyme Activity from the Chick Retina In Vitro
- 11:15 - 11:30 F.J. Schweigert (Munich): Carotenoids and Vitamin A in Follicular Fluid of White- and Yellow-fat Animals
- 11:30 - 11:45 R. Castillo (Montpellier): Effects of Moulting Cycle on the Metabolism of Carotenoid Pigments of the Hermit Crab Clibanarius erythropus
- 11:45 - 12:00 M. Heinonen, V.M. Ollilainen, E. Linkola, P. Varo and P. Koivistoinen (Helsinki): Distribution of Carotenoids and Retinoids in Finnish Foods

Session 7: MEDICAL ASPECTS OF CAROTENOIDS

Session Chair: M. Mathews-Roth (Boston, MA)

- 1:30 - 2:00 pm N.I. Krinsky (Boston, MA): Overview of Carotenoids in Medicine
- 2:00 - 2:30 M.R. Banerjee (Lincoln, NE): In Vitro Studies of β -Carotene Function
- 2:30 - 3:00 L. Santamaria and A. Bianchi (Pavia): Cancer Chemoprevention by Carotenoids in Animal Models and Perspectives in Human Interventions

Session 7: MEDICAL ASPECTS OF CAROTENOIDS (Continued)

- 3:00 - 3:15 Break
- 3:15 - 3:45 A. Kornhauser, W. Wamer, L. Lambert, and A. Giles, Jr.
(Washington, DC): In vivo Protection by β -Carotene Against Phototoxicity
- 3:45 - 4:15 H.F. Stich, M.P. Rosin, A.R. Hornby, B. Mathew, R.
Sankaranarayanan and M. Krishnan Nair (Vancouver,
B.C.): Human Intervention Studies with
Carotenoids
- 4:15 - 4:45 A. Bendich (Nutley NJ): Carotenoids and the Immune
System
- 4:45 - 5:00 D. Nierenberg, T. Stukel, R. Greenberg and J. Baron
(Hanover, NH): Determinants of Plasma Retinol and
Beta-Carotene Levels
- 5:00 - 5:15 D.I. Thurnham, E. Smith and P.S. Flora (Birmingham,
UK): Plasma Carotenes in the 1986-87 British
Nutrition Survey
- 5:15 - 5:30 L. Bianchi, R. Pizzala, A. Bianchi and L. Santamaria
(Pavia): Beta-Carotene and Canthaxanthin Prevent
Photomutagenesis Induced by Furocoumarins in
Salmonella typhimurium
- 5:30 - 5:45 J. Schwartz, D. Sloane and G. Shklar (Boston, MA):
Immune Surveillance Enhancement Associated with
Carotenoid Inhibition of Oral Cancer in Hamster
Buccal Pouch Model

Friday, 31 July 1987

Session 8: COMMERCIAL ASPECTS OF CAROTENOIDS

Session Chair: L. Borowitzka (Bayswater, Australia)

- 8:30 - 9:15 am K. Bernhard (Basle): Synthetic Astaxanthin. The Route of a Carotenoid from Research to Commercialization
- 9:15 - 9:45 A.M. Nonomura (San Diego, CA): Industrial Biosynthesis of Carotenoids
- 9:45 - 10:00 Break
- 10:00 - 10:30 P.P. Hoppe (Ludwigshafen): Application of Carotenoids to Animal Nutrition
- 10:30 - 10:45 R.F. Taylor (Cambridge, MA): Established and Future Markets of Beta-Carotene
- 10:45 - 11:00 S.J. Schwartz and L.A. Chandler (Raleigh, NC): Chemical Changes of Carotenes in Foods as Affected by Processing
- 11:00 - 11:15 T.H. Roshdy and H. Daun (New Brunswick, NJ): Volatile Thermal Degradation Products of Canthaxanthin Heated at 210°C in a Model System
- 11:15 - 11:45 A.J. Young, P. Berry and G. Britton (Liverpool): Bleaching Herbicides and Carotenoid Compositions
- 11:45 - 12:00 T. Storebakken, P. Foss, K. Schiedt, S. Liaaen-Jensen, E. Austreng and U. Manz (Sundals, Trondheim and Basle): Pigmentation of Atlantic Salmon, Rainbow Trout and Sea Trout with Astaxanthin or Astaxanthin Dipalmitate in Comparison with Canthaxanthin

Session 9: SYMPOSIUM SUMMARIES

- 1:30 - 1:50 B.C.L. Weedon (Nottingham): New Structures, Syntheses and Analyses
- 1:50 - 2:10 T.W. Goodwin (Liverpool): Biosynthesis, Function and Photobiology
- 2:10 - 2:30 M. Mathews-Roth (Boston, MA): Nutritional, Metabolic and Medical Aspects
- 2:30 - 2:45 SYMPOSIUM CLOSING

POSTER SESSIONS

- POSTER SESSION 1: 27-28 July 1987
Posters P1 through P36
- POSTER SESSION 2: 29-30 July 1987
Posters P37 through P69